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The Effect of Nutrition on the Development of Tuberculosis

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That diet exerts a very great influence on the incidence of tuberculosis has long been accepted by the medical profession as a factor of major importance in its control. A survey of the literature on the subject shows, however, that while much has been done in the way of dietetic treatment of cases, and the study of the effects of the various vitamins on the disease, very little experimental work has been undertaken to put the thesis to experimental proof.

During the years of the Great War the malnutrition in Germany due to the blockade was directly responsible for an increase in the tuberculosis death-rate from 142 to 239 per 100,000 of the population.

PRIESTMAN (1925) reported as a result of the examination of children at the Folkestone Tuberculosis Dispensary that the incidence of tuberculosis bore a direct ratio to poverty.

BALDWIN (1925), discussing the aetiology of tuberculosis, stated that poverty was the most important single element in the development of tuberculosis. Consumption, he stated, was the social disease *par excellence* at the terminal stage of poverty. The same author quoted the figures of KOROSI for Budapest, where among each 10,000 living inhabitants, 40 well-to-do persons, 62·7 moderately well-to-do, 77·7 poor persons, and 97 paupers died of consumption.

DAWSON BATES (1932) showed that the death-rate from tuberculosis in Belfast fell steadily from 4·7 per 1,000 in 1890 to 3·1 per 1,000 in 1900, to 2·1 per 1,000 in 1910, and to 1 per 1,000 in 1930. He considered that this fall was due to improved methods of farming and increased transport facilities, together with careful supervision of food resulting in increased quantity and quality, with balance and study of food values, even for the poorer section of the community.

The Principal Medical Officer of Swaziland (1932) considered that the most important factors in the causation of tuberculosis in Swaziland natives were housing and diet. The diet of the natives was ill-balanced, and that it had an influence on tuberculosis was borne out by the rapid recovery of early cases of joint and gland tuberculosis under conditions of good feeding in hospital.

The Senior Medical Officer, writing on tuberculosis problems in the Gilbert and Ellice Islands (1932) considered that diet was a factor contributing to the high incidence of the disease.

OVERLAND (1935) reported that tuberculin test of recruits in Norway in 1911 and 1934 showed little change in the number of positive and negative reactors, while the mortality from tuberculosis had diminished greatly. This pointed to the fact that although there was the same proportion of infections, resistance to the disease had increased. The author considers this due to improved nutritional factors, and not to housing. He supported this contention by statistical study of two groups of soldiers housed in different barracks. One group were housed in modern barracks over a period of years, and the other group were housed in particularly bad conditions. The group in the good barracks had the highest sickness rate until 1937 when, after improvement in the diet, it became normal.

LANGE (1925) considered that there was a strong correlation between the incidence of tuberculosis and social status.

MULLER (1935), in a somewhat surprising contribution on rickets, claimed that the family history of all rachitic children in his investigation was tainted with tuberculosis, and inferred that tuberculosis in the mother was invariably followed by rickets in the children. He concluded that tuberculous troubles in the adult were often followed by rickets in the child.

LIVESAY (1934) claimed that due to an improvement in the diet given to patients in a mental hospital the death-rate from tuberculosis fell from 112 in the years 1905 to 1914 to 10 in the decade 1926 to 1935. He considered that phthisis could be practically abolished in mental and kindred institutions by good feeding and fresh air.

SCHUTZE & ZILVA (1927), using guinea-pigs inoculated subcutaneously with 0·1 mm. of living tubercle culture, found that those given an abundant diet lived twice as long as those on a restricted diet, and commented that the death-rate provided evidence of the deleterious effect of a restricted diet on the course of tuberculous disease.

GRANT, SUYENAGA & STEGEMAN (1927) found that rats from normal mothers, fed a good ration, were immune to doses of 2 m.g. of bovine tubercle bacilli inoculated subcutaneously, while rats fed a rachitic diet showed pulmonary tuberculosis after doses of only 0·2 m.g., and 0·5 m.g. of tubercle bacilli.

SCHMIDT-LANGE (1935) described a series of experiments on guinea-pigs in which half were given a strictly limited diet, and the other half double the amount. Both groups were inoculated with human tubercle bacilli of low virulence. The results were classified according to *post-mortem* and histological findings, and the extent of infection so estimated was 63 per cent. higher in the underfed animals. He carried out a similar experiment where a group of white mice were given insufficient food, and a control group were given an adequate amount of the same diet, and both infected with avian tubercle bacilli by inoculation. After five to six months the two groups were post-mortemed, and in this case widespread tubercle infection was found in both groups.

Experimental

The following experiment was carried out to determine the effect of diet on susceptibility to tuberculous infection. The experimental animals used were pigs.

The experiment, which lasted for 16 weeks, was commenced on 30.4.37, one week after the arrival of the pigs at the Institute. On arrival the pigs, which were all about ten weeks old, were divided into two groups, each containing six hogs and two gilts. Both groups of pigs were balanced as regards litter, weight and general appearance. One group (group 1) was fed on a poor diet and the other (group 2) on a good well balanced diet. The average weight of the pigs on the poor diet was 50·3 lb., whilst those on the good diet averaged 50·1 lb.; both groups were therefore as nearly equal as possible.

Some diarrhoea was at first evident on placing the pigs on the experimental diets and it was therefore decided to supplement the diet of both groups with 2 lb. separated milk and 1 lb. of green food per pig per day for a few days. Some of the pigs in both groups showed irregular appetites during the first few weeks and it became evident that an intercurrent infection was present and before the animals were experimentally infected with tubercle bacilli, five had died, two on the poor diet (pigs Nos. 12 and 13) and three on the good diet (pigs Nos. 10, 14 and 16), one other on the poor diet died from a similar cause eleven days after being fed the tubercle bacilli. Both groups were therefore depleted by three animals, before the experiment proper had been begun.

The diets fed at the commencement and throughout the experiment consisted of :—

Poor Diet (*Group* 1)	Per cent.	*Good Diet* (*Group* 2)	Per cent.
Fine Sharps	40	Fine Sharps	40
Oatmeal	40	Ground barley	30
Ex. earth nut cake meal	7½	Flaked maize	20
Salt	½	White fish meal	10
		1 lb. separated milk per 1 lb. meals fed.	
		¾ lb. green food per pig daily.	

The two groups of animals were fed twice daily at 6.30 a.m. and 4 p.m., the food being fed as a thick porridge without previous soaking. Milk, where fed, was mixed with the food. Both groups were fed to appetite, and water was allowed *ad lib.*; oat straw was used as bedding.

The animals were housed in a well lighted and well ventilated piggery, and no outside run was allowed. Each pig was weighed once weekly before the morning feed.

The animals were fed their respective diets until a marked difference in weight and general appearance was seen between the two groups, the average weight of those in Group 1 then being 65·4 lb. and the average weight of those in Group 2 being 81·4 lb., the average difference in weight in favour of the good diet being 16 lb.

In order to exclude the possibility of the existence of tuberculosis before attempting to infect the pigs experimentally they were all subjected to the double intradermal tuberculin test in the skin of the ear; synthetic medium tuberculin was used and all were found to be free from tuberculosis.

The method of experimental infection was as follows :—

One milligram of pure bovine culture of *M. tuberculosis* in 1 millilitre of saline per pig, was given in half a pint of separated certified milk, followed by another half pint of separated milk to wash down the trough. The infected milk was given before the morning feed, which had been delayed to ensure that the milk would be drunk. Each pig took all of the infected milk without difficulty, and the infective dose was therefore uniform in both groups.

When the experiment terminated eleven weeks later, those pigs on the poor diet averaged only 86·5 lb. compared with the average weight of 178·4 lb. in the case of those on the good diet. The weight increases and differences of the two groups are given in the following table.

Time of Weighing	Group I Lb.	Group II Lb.	Difference Lb.
Beginning of experiment	50·3	50·1	0·2
At infection with *M. tuberculosis* ..	65·4	81·4	16·0
End of experiment	86·5	178·4	91·9
Total gain	36·2	128·3	92·1
Gain from infection until death ..	21·1	97·0	75·9

It will be seen from the above table that both groups actually continued to increase in weight. The increase in the case of Group I was slight, while in Group II the increase in weight was well maintained in spite of tubercle infection. In the latter group the pigs at the end of the experiment were in good killing condition and except for one pig (No. 11) there were no symptoms indicative of disease.

The food consumption in Group I was also consistently below normal, whilst all the pigs in Group II always had a good appetite.

At the end of the experiment all the pigs in Group I, with one

exception (No. 15), showed evidence of rickets. Four of them (Nos. 3, 7, 9 and 11) were also in poor condition and had an unthrifty appearance.

All the pigs were then slaughtered and examined *post-mortem*.

Post-mortem Findings

Group I.—Those in the poor group showed a generalised tuberculosis which was evident in most of the cases, on opening the carcase. The lymphatic glands in this group were markedly enlarged with abscess formation, and there was much destruction of the glandular tissue; in many cases the glandular tissue was merely encapsulating a caseous mass. The lungs were affected in each case, and lesions were found throughout their substance without difficulty, two pigs showing miliary tuberculosis.

The submaxillary and mesenteric lymph glands were markedly enlarged and showed extensive areas of caseation in all cases. The retropharyngeal glands were similarly affected in three cases.

The spleen and liver were affected in all cases except in Pig. No. 2 in which the spleen only was affected, while Pigs Nos. 9, 3 and 7 showed involvement of the thymus glands.

The carcase lymph glands had become involved in Pigs Nos. 9, 2, 3 and 7.

Group II.—Pigs in Group II, on the other hand, showed a definite attempt by the lymph glands to limit the infection to areas, with less tissue destruction. The lymphatic glands were also less enlarged and in many cases were not obviously pathological until they had been incised.

The lungs in one case were not affected, and in two others only one localised lesion could be found, the remaining two showing a few small lesions throughout the substance. The spleen had escaped completely in three of the animals; in one, one lesion could be found, while the last showed a few small scattered nodules.

The liver was, with one exception, uniformly affected, showing small scattered caseous nodules in the capsule or substance. No evidence could be found in any of the pigs in this group of an extension of the infection into the carcase lymphatic glands. In only one case was evidence of tuberculosis found on examination of the thymus gland. Smears were made from an abscess which had developed along the femur of Pig No. 1 and were examined for tubercle bacilli, but no evidence of this was obtained.

The pig in best condition in the poor diet group (Pig No. 15) showed a less extensive infection than the others in the same group, while Pig No. 11, the least thriving pig in Group II, had more extensive lesions than the others of its group.

Conclusion

It was evident that the infection was actively progressive in Group I. There was, however, every appearance that had the members of Group II been allowed to live, the infection in their case might have proved to be quiescent, in that, with one exception, they had shown no clinical indication of tuberculosis.

Summary

1. The literature on diet and tuberculosis is reviewed.

2. An experiment is described in which two groups of pigs, one fed a poor and the other a good diet, were infected with *M. tuberculosis* by ingestion, milk being the vehicle.

3. All pigs were about ten to twelve weeks old at the beginning of the experiment, which lasted for 16 weeks, and all were tuberculin tested before the experiment, using the intradermal test with synthetic tuberculin. The test was negative in all cases.

4. At the beginning of the experiment both groups showed about the same average weight. At the termination of the experiment those in the good group averaged 178·4 lb. and those in the poor group 86·5 lb.

5. All the poor group showed evidence of rickets.

6. All the pigs in both groups showed evidence of tuberculosis on *post-mortem* examination. The disease was more generalised and actively progressive in the poor diet group. The lymph glands showed general enlargement and extensive caseation with much destruction of gland tissue.

Those on the good diet showed less generalisation and less tissue destruction.

7. Three animals in each group died from an intercurrent infection.

8. From result obtained it appears that diet exerts some influence on resistance to tuberculous infection. In view of the small number of animals available, it would be of interest to repeat the experiment on larger groups of pigs.

Acknowledgment.—I wish to thank Sir John B. Orr, Director of the Rowett Research Institute, Aberdeen, for the hospitality of the Rowett Institute where these experiments were undertaken.

References

Baldwin, E. R. (1925.) Osler and Macrae, "Modern Medicine," **I**, 303.
Dawson Bates, Sir R. (1932.) *J. State Med.*, **40**, 433-442.
Grant, A. H., Suyenaga, B., and Stegeman, D. E. (1927.) *Amer. Rev. Tuberc.* **16**, 628-641.
Lange, B. (1935.) *Dtsch. med. Wschr.*, **61**, 1711-1716 and 1753-1757.
Livesay, A. W. B. (1936.) *B. M. J.*, **1**, 1246-1249.
Muller, G. (1935.) *Wien med. Wschr.*, **85**, 406-463.
Overland, A. (1935.) *Tidsskr. norske. Laegeforen.*, **55**, 730-741.
Priestman, A. (1925.) *Brit. J. Tuberc.*, **19**, 148-150.
Principal Medical Officer, Swaziland (1932). Annual Medical and Sanitary Report, 1932, page 3.
Senior Medical Officer, Gilbert and Ellice Islands. Annual Report, 1932, page 2.
Schmidt-Lange, W. (1935.) *Arch. Hyg.*, Berl., **115**, 9-37, 38-53.
Schutze, H., and Zilva, S. S. (1927.) *J. Hyg.*, **26**, 204-212.

The Veterinary Investigation Officer—His Relationship with Practitioner and Farmer*

H. E. HARBOUR, B.A., M.R.C.V.S.

I am very grateful to your Secretary for affording me the privilege of addressing you to-day on the work of a veterinary investigation officer and I welcome very much the opportunity of meeting practitioners and other members of this division and of explaining something of the nature of the work on which I and my colleagues in Scotland will be engaged.

The veterinary investigation officers form, I think, the smallest branch of our profession but the service is showing a steady and healthy growth. The appointment in 1923 of the first two veterinary advisers (as they were then called) was soon followed by others and for many years there were eleven such officers—nine in England and two in Wales. A few years ago, a further appointment was made at Leeds while just recently there have been further additions in the appointment of veterinary investigation officers at Aberystwyth and, in Scotland, at Glasgow and Edinburgh. A third Scottish appointment—for the North of Scotland—has yet to be made.

Many of these veterinary investigation officers in England and Wales have set a very hot pace—an example which we who come later will find very difficult to emulate. The work of Montgomerie on the liver fluke, of McEwen on contagious abortion and of Blakemore on fowl paralysis are only a few examples of the many which could be mentioned.

Much of the research which has been undertaken, in the past, by veterinary investigation officers has been of great practical value and has led to important advances in our knowledge of and control of animal diseases. Much of this work, too, has been undertaken under conditions which were far from ideal.

In the early days there was a good deal of friction between the veterinary adviser and the practitioner but frank discussion between representatives of the "National" and of the Ministry of Agriculture led to the formulation of special regulations covering the duties of the veterinary investigation officer. These safeguards, together with the efforts of certain individual investigation officers and practitioners, have led to a much better understanding between the two parties. It is now, in fact, generally accepted that the veterinary investigation officer is very largely dependent on the practitioners, while many practitioners have come to realise that they can obtain a great deal of assistance from their veterinary investigation officer.

The special regulations referred to were reproduced in *The Veterinary Record* of 1931, Oct. 24th, p. 1077, and will not be detailed here.

What are the duties of a veterinary investigation officer? How does he stand in relation to your client the farmer and to you the practitioner and how can you make use of him? These are the questions which I shall try to answer.

The veterinary investigation officer, in common with other technical advisers attached to the agricultural college, has the two primary duties of giving advice and conducting local investigations.

Requests for advice may come to him directly from farmers or indirectly from other agriculturalists. In all such cases the veterinary investigation officer will act only in co-operation with, or with the full knowledge and consent of, the farmer's veterinary surgeon—except of course in the case of remote hill sheep farms where no veterinary surgeon is normally employed, and generally, in the case of poultry diseases.

Advice is given in connection with outbreaks of disease or with the prevention of disease, and investigations into local diseases of obscure origin may be carried out.

The veterinary investigation officer has his own laboratory and keeps in close touch with workers at research institutes, veterinary colleges, etc. He is able to assist the practitioner where required by applying laboratory methods to help in the attempt to solve the many problems which crop up in the field. This aspect of the veterinary investigation officer's work is perhaps the most important and full use should be made of the facilities. Every outbreak of disease ought

* Presented to the Scottish Metropolitan Division, N.V.M.A., at Stirling, June 12th, 1943.

to be thoroughly investigated. Practitioners have neither the time nor the laboratory facilities to carry out such investigations but they should not hesitate to call in the investigation officer whose services in connection with such investigations are free of charge.

In addition to this investigational work certain routine laboratory tests (blood tests, milks for mastitis, worm egg counts, etc.) will generally be carried out for practitioners if required and moderate charges are usually made for these services.

The veterinary investigation officer is not necessarily a specialist, but if specialised knowledge on a particular subject is wanted the investigation officer can and does seek the advice of the particular expert concerned. Neither is he primarily a research officer: the research, or at least the *successful* research, is that part of the work which catches the public eye, but a great deal of other less spectacular but patient and painstaking work goes on at all the veterinary investigation centres, *viz.*, diagnostic work in collaboration with practitioners —poultry *post mortems*—public health milk testing—educational work, lecturing, demonstrations and the like.

With regard to the investigation officers in Scotland it has been laid down that their research work should be conducted under the general supervision of the Scottish Board of Research in Veterinary Science which was set up by the Agricultural Research Council to direct and co-ordinate all investigation of animal diseases in Scotland. This, I think, should prevent needless duplication.

The veterinary investigation officer comes into direct contact with the farmer in educational work, lectures, demonstrations, at shows and so on. It is one of his duties to bring the results of research into application in the field, to educate the farmer to do something to prevent losses from disease and to encourage co-operation between farmers and practitioners with a view to arranging concerted action against disease causing particular damage. Perhaps the best example I can give of this co-operative effort is in the control of trichomonas abortion in groups of small farms where communal bulls are used. In such cases some of the farmers may be clients of one practitioner and some clients of another and unless some co-operative effort is made the chance of satisfactorily clearing up the disease in the area is slight. Here the veterinary investigation officer can make himself useful. He may or may not have been required to assist in establishing the diagnosis but in any case his chief duty will undoubtedly be to call together a meeting of the farmers and veterinary surgeons concerned, to explain to the farmers the nature of the disease and to encourage co-operative effort to stamp it out.

I have tried in this short talk to give some idea of the scope of a veterinary investigation officer's duties. I have attempted in so describing the duties to indicate the relationship which exists between the veterinary investigation officer and the practitioner and the farmer. It is a co-operative effort—the three human personalities allied against disease.

It should perhaps be emphasised that the service is *not* a means of giving the farmer free advice and short circuiting the veterinary practitioner. Difficult cases are bound to occur; we are all human and make mistakes, and farmers also are human and like to get something for nothing. But taking it all round the service ought to be of benefit to the practitioners in Scotland as it has proved to be in the south and one would like to see it utilised to the full. If expansion is thus encouraged perhaps the day may come when *every* practitioner and *every* farmer in *every* county is adequately served by a laboratory.

It does not lie within the scope of this paper for me to discuss whether the veterinary investigation officers should be absorbed into the Animal Health Division or whether they should be posted to research institutes or veterinary colleges rather than agricultural colleges. These are questions of the future, and having to establish a laboratory under war-time conditions I have to take things as they are. You will of course realise the extraordinary difficulty of obtaining either laboratory equipment or trained technical staff during war-time and will not expect that there could immediately be created the facilities which exist in some of the veterinary investigation officer centres in the south. (In any case, most of these have been built up over a period of nearly 20 years and they were, at the beginning, very much "one man and a boy" jobs, the man and the boy being usually housed in a shack with two slides and a coverslip between them!)

I should like to conclude by acknowledging my own personal indebtedness to the Director and staff of the Moredun Institute, to various members of staff of the Royal (Dick) Veterinary College and to my colleagues on the staff of the Agricultural College. I have become very adept at borrowing but though they haven't let me get away with any of the heavier equipment I have received a very great deal of help both in materials and in much useful advice. I should like also to thank all those practitioners with whom I have already been working. Coming over the border as a mere Sassenach I must confess I felt a little timid, but the kindly hospitality and friendly co-operation of the Scottish practitioners and farmers have made me feel that I have actually come home.

CLINICAL COMMUNICATION

Strangulated Hernia—Bovine

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Subject.—Cross-bred Hereford cow, aged nine years.

History and Symptoms as supplied by Owner.—Calved three months before onset of illness. Had been noticed for some months to be passing faeces resembling those associated with Johne's disease, but she retained fair condition and had been milking well. One evening sudden and complete loss of milk secretion occurred, the cow having yielded normally the same morning. Appetite was now poor, and discomfort was exhibited by restless movements of hind legs and constant change of position. No evidence of great pain. Rumen appeared full and very "solid." On the following day rumination ceased and appetite failed completely. A soft swelling was noted in the region of the mammary vein on the left side of the abdomen; it appeared to be increasing in size. Rumen was distended with gas. Veterinary advice was sought on the third day.

Examination.—Animal appeared dazed, and oblivious of general handling and palpation. She had to be driven to make her move. No apparent pain. Temperature 104°. Pulse 80—weak and rapid. Respirations slow. The rumen was very full, and no movements were detected therein. There was no evidence of defaecation during the last 24 hours. The rectum was full, the faeces being foul smelling and dry.

The swelling in the region of the mammary gland was painless and extending under the abdomen and backward towards the left side of the udder and the hind leg of same side. The content of the swelling was fluid and 5 c.c. was drawn off with sterile needle and syringe. This appeared to be normal blood, and clotted on standing.

Diagnosis.—Primary trouble believed to be ruminal impaction, due to gorging of coarse herbage. The swelling in the mammary region was thought to be unimportant—a haematoma of the vein caused by the animal being attacked by the rest of the herd after onset of illness.

Treatment.—Mag. sulph. 1 lb., nux. vom. 2ʒ, ammon. carb. 2ʒ, given in five gallons of warm water per stomach tube. Liberal quantity of water supplied, and all food except greenstuffs withheld.

Sequelae (apparent on the following day).—The owner stated that the animal was "on the mend," but the pulse was still weak and rapid; temperature 104°. Animal appeared brighter and in less discomfort, moving about more, and more responsive to handling. A small quantity of greenstuff had been eaten, but no faeces had been passed and enemata failed to produce any result. The swelling under abdomen remained about the same size; it was soft and painless. The administration of nux. vom. and ammon. carb. was continued.

A further examination was made after twelve hours. The cow's condition was unchanged, except that her general appearance suggested freedom from discomfort.

It was decided to perform rumenotomy on the following day, as the abdomen was more distended, and there was no sign of resumption of rumination. However, one hour later the owner reported that the animal had dropped dead a few minutes after the last examination. Strangulated hernia was considered a possible cause.

Post-mortem Examination.—Complete examination was spoiled as the hide had been removed and the abdomen opened before arrival. The slaughterman stated that on reflecting skin from the region of the haematoma a large clot of blood came away, leaving a portion of intestine extruding from the abdominal cavity.

Examination of the strangulated portion, which was about 18 inches long, showed it to be very swollen and gangrenous, its lumen being scarcely discernible, and the whole hardly recognisable as intestine.

The rumen was engorged with a mass of dried ingesta, the whole length of the intestine being almost devoid of organic matter.

Discussion.—This case presents the following points of interest:—

1. The absence of acute pain constituted a deceptive and well-nigh incredible feature throughout the course of the illness.
2. Close resemblance to normal ruminal impaction, except for bad pulse.
3. Absence of local pain at the site of strangulation.
4. Most ruminal impactions can be removed by administration of purgatives with a liberal quantity of water. It is believed that many unnecessary rumenotomies are inflicted on cows, in cases where the above type of purge would succeed.

One may fittingly conclude with the reflection that even an obvious haematoma should never be opened without careful consideration—it may nevertheless contain a portion of intestine.

ABSTRACTS

[SPORADIC BOVINE ENCEPHALO-MYELITIS: FILTRATION OF THE CAUSAL AGENT. Stearns, T. W., and McNutt, S. H. (1942.) *Amer. J. vet. Res.* **3.** 253.]

An infectious disease of cattle tentatively called sporadic bovine encephalomyelitis has been reported by a number of observers in the U.S.A. The condition usually affects animals under three years old and may commence with tenderness of the feet and swelling just above the hoof. The main symptoms are loss of appetite, inactivity and high temperature; some animals become prostrate. There is marked depression, and in the final stages serofibrinous peritonitis and pleurisy. Milder forms of the disease occur and some animals recover. The infective agent is not easy to filter and may be a coccus-like body. Calves can be infected by subcutaneous inoculation and guinea-pigs by intraperitoneal inoculation. The infection has been passaged in chick embryos.

Recovered animals are immune and neutralising antibodies can be demonstrated in their serum. Intradermal inoculation of virulent material in guinea-pigs produced no apparent disease but provided a solid immunity. J. F.

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[THE *IN VITRO* NEUTRALISATION OF HOG-CHOLERA VIRUS WITH HOG-CHOLERA ANTISERUM. Kernkamp, H. C. H., and Roepke, M. H. (1942.) *Amer. J. vet. Res.* **3.** 300-303. 17 refs.).]

Authors incubated virus and antiserum mixed in proportions from 1 : 0·67 to 1 : 30 at 37·5° C. for a period of one hour in one series and for five hours in another. The fixed amount of virus employed was a certain infective dose for pigs. Subsequent inoculation of pigs with these mixtures showed that when the amount of serum was less than the virus, the mixture infected pigs in both series, while in the case of mixtures incubated for one hour only, virus-serum ratios of 1 : 1·34 and 1 : 2·5 also infected pigs. Author considers this difference due to more complete neutralisation of virus by longer incubation. Pigs which received mixtures having a higher antiserum ratio than 1 : 2·5 survived and 72 per cent. of these were found later to be susceptible.

A. W. G.

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[I.—CROSS-AGGLUTINATION STUDIES BETWEEN SALMONELLA PULLORUM AND OTHER MICROORGANISMS ISOLATED FROM TURKEYS POSITIVE TO THE PULLORUM TEST. Sanders, R. G., Pomeroy, B. S., and Fenstermacher, R. **II.—SALMONELLA INFECTIONS OF BREEDING TURKEYS.** Pomeroy, B. S., and Fenstermacher, R. (1943.) *Amer. J. vet. Res.* **4.** 194-198 and 199-208.]

The above publications show that Salmonella infection presents a very serious problem to the turkey industry in Minnesota. Losses appear to be heaviest during the first four weeks of the poult's life and in some cases may reach 90 per cent. The organisms isolated from affected birds vary, but they include the well-known *S. pullorum* and *S. typhi-murium* and in some birds as many as three different types of Salmonella have been recovered. This is the more remarkable because none of the adults were found similarly affected. Survivors from outbreaks often show evidence of infection by the application of agglutination tests but in view of the various types of infection no single test can be relied on to remove all Salmonella-infected turkeys. Apparently some of the Salmonella give rise to a localised infection within the intestinal tract which may be of a transient or permanent nature.

The first paper deals chiefly with the problem of determining why one cannot consistently isolate *S. pullorum* from turkeys which react to the agglutination test and also why one so frequently meets with atypical agglutinations in the routine testing of turkeys for pullorum disease. Apparently the explanation lies in the fact that a certain amount of cross-agglutination occurs between *S. pullorum* and other organisms consistently isolated from turkeys.

G. D.

No cases of anthrax, glanders, rabies or horse mange were reported in Canada during the past fiscal year, according to the report of the Veterinary Director General. No cases of dourine or sheep scab have occurred in the Dominion for 21 and 14 years respectively.

* * * * *

"Stick to the breed you have found to be suitable to your area and improve upon it," was the advice given to members of Blackmoor Gate (Devon) F.U. by Mr. Austin Jenkins, Superintendent Livestock Officer. He advised keeping Devon cattle in the north of the county and the South Devon breed in the south.

Alkali Reserve of the Blood of Ankole and Zebu Cattle in Uganda

In supplementary work to that already published [*Vet. Rec.* (1943). **55.** 128] Mr. E. R. Jones, of Entebbe, Uganda, reports that the alkali reserve of the blood was studied on a group of 25 known healthy animals, comprising 18 Zebu, six Ankole cattle and one Ayrshire.

In 51 analyses the extreme range was 41·9 to 88·0 vols. per cent., with a mean of 68·8. The standard deviation was ± 7·2, the standard error of mean ± 1·009, the coefficient of variation 10·5 per cent., the class mode 65·0 to 75·0, and the working range [mean ± 1 S.D.] 61·6 to 76.

The values obtained approximate those obtained by French (1938) for Tanganyika cattle, by Dukes (1935) for plasma and are slightly higher than those recorded by Sjollema (1928) for serum.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Aug. 31st.—Special meeting of Council, N.V.M.A., at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2; meetings of the Finance and General Purposes Committee, also of the joint Veterinary Officers and Public Health and the Parliamentary Committee—both at 36, Gordon Square, W.C.1.

Sept. 1st.—Meetings Editorial Committee, N.V.M.A.: Special, 10.30 a.m.; Ordinary, 2.30 p.m.

Sept. 3rd.—Meeting of the Yorkshire Division, N.V.M.A., at Leeds, 2.30 p.m.

Sept. 3rd.—Meeting of the North Wales Division, N.V.M.A., at Bangor, 2 p.m.

Sept. 3rd.—Meeting of the South Wales Division, N.V.M.A., at Llandilo, 1.30 p.m.

Sept. 3rd.—Special Meeting of the Lancashire Division, N.V.M.A., at Liverpool, 2.30 p.m.

Sept. 16th.—Annual Meeting of the Society of Veterinary Practitioners at Nottingham, 2.15 p.m.

Sept. 17th.—Meeting of the Welsh Branch, N.V.M.A., at Shrewsbury, 2 p.m.

Sept. 29th and 30th.—**N.V.M.A. Annual Meeting and Conference, London School of Hygiene and Tropical Medicine.**

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N.V.M.A. Annual Meeting and Conference

Members will receive with this issue of *The Veterinary Record* a supplement containing the Agenda of the Annual General Meeting of the Association to be held on Wednesday, September 29th, and also the Annual Report and Balance Sheet.

Tickets are now available for the President's Reception at the Waldorf Hotel on Tuesday evening, September 28th, and also for the Luncheon being arranged by the Association at the Connaught Rooms, Great Queen Street, W.C.2. on Wednesday, September 29th price 10s. 6d. Applications for these tickets (enclosing appropriate remittance) should be addressed to the General Secretary, N.V.M.A., 36, Gordon Square, London, W.C.1.

Arrangements have been made for two papers to be presented for discussion at the conference: one on "The Veterinary Surgeon in the Development of the Colonies" by Major J. M. Smith, O.B.E., M.R.C.V.S., and the other on "The Improvement of Livestock" by Professor Robert Rae, B.Sc. (Agr.), of the Department of Agriculture, University of Reading.

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News of Members, R.C.V.S., after the Fall of Singapore

We are sure that his friends in the profession will be glad to hear that news has now been received that Mr. A. G. McCrea, M.R.C.V.S., D.V.S.M., Municipal Veterinary Officer, Georgetown, Penang, is safe, having been taken a prisoner of war after reaching Singapore.

First Wellcome Fellowship for Veterinary Research

In our issue of last week we published the announcement by the Trustees of the Veterinary Education Trust of the election of Mr. John Lochiel McGirr, B.SC., M.R.C.V.S., as the first Fellow to be elected to the Wellcome Fellowship for Veterinary Research.

Mr. McGirr took a B.Sc. in Natural Science with first-class Hons. in Biochemistry at Glasgow University in 1937, and subsequently went to the Royal (Dick) Veterinary College, Edinburgh, graduating from there as a Member, M.R.C.V.S., in July, 1942. Whilst at Glasgow he was awarded in 1933 a Patterson Bursary of that University. In 1934 he obtained first place and Black Medal in Chemistry. In 1938 he was awarded a Veterinary Scholarship by the Agricultural Research Council.

Whilst at Glasgow he participated in research work and has published with others in *The Quart. J. Exp. Physiology* and biochemical journals, papers on: (1) The effect of Fracture of Bone on the Metabolism of the Rat; (2) A study of the Effect of Overfeeding on the Protein Metabolism of Man; (3) The effect of Muscular work at different levels of Energy Intake with particular reference to Timing of Work in Relation to Taking of Food.

Since August, 1942, Mr. McGirr has been working on the problem of acid-fast organisms at the Veterinary Laboratory of the Ministry of Agriculture, with particular reference to the preparation, purification and biological testing of a considerable number of purified protein derivatives. He will continue this work with his Fellowship, paying particular attention to the specificity of tuberculins, especially of proteins of the P.P.D., tuberculin type. The Research Fellowship will be held at the Ministry Laboratories under the direction of the Director, Mr. T. Dalling.

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"ALLIED" VETERINARIANS: A REQUEST OF PRACTITIONERS

It is desired to arrange that a number of veterinary surgeons in the armies of the Allied Nations in this country (nine Polish and one Czechoslovakian), at present attending "refresher courses," shall shortly each spend a few weeks with a British veterinary practitioner, paying for their board and finding accommodation near the surgery. Practitioners willing to accept one of these officers are requested to communicate direct with Professor T. Dalling, Veterinary Laboratory, New Haw, Weybridge, Surrey.

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PERSONAL

Birth.—KEITH.—On August 20th, at Galashiels Hospital, to Cherry, wife of N. W. Keith, M.R.C.V.S., Kelso—a son.

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R.C.V.S. OBITUARY

LILBURNE, John Frederick William, 127, Sea Bank Road, Wallasey, Ches. Graduated Liverpool, July 13th, 1932. Died August 14th, 1943.

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AGRICULTURAL RESEARCH COUNCIL

The Committee of the Privy Council for Agricultural Research has appointed Lord De La Warr to be Chairman of the Agricultural Research Council in succession to the late Sir Thomas Middleton.

The Committee has also appointed Professor I. de Burgh Daly, F.R.S., to be a member of the Agricultural Research Council in the place of Sir Joseph Barcroft, F.R.S., whose term of office as a member has expired.

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LEGAL NOTES

Alleged Contravention of the Tuberculosis Order.—What was described by the Chairman of the Magistrates as "a difficult case" was decided in favour of the prosecution at Flint Sessions recently, when Fred Jones, of Ffrith Farm, Flint, pleaded not guilty to a charge of contravention of the Tuberculosis Order, 1938. Mr. Clement O. Jones defended.

Inspector Williams, Flint, said that on July 2nd a veterinary surgeon visited Ffrith Farm and saw an empty stall in a shippon which contained signs of fresh cow dung and sputum. Jones told him that the cow had been sold, but later said the cow which usually went to that stall was a "dry" cow which was in the field. The cow was later found to be tuberculous and was slaughtered. The Order of 1938 laid down that if a cow was suspected to be suffering from tuberculosis the owner should inform the police or a veterinary surgeon with all possible speed.

Replying to Inspector Williams, defendant said he had suspected the cow as being a "wrong one," and had intended selling it in the open market.

Mr. Clement O. Jones submitted that whereas the veterinary surgeon said the cow had an intermittent cough, Jones maintained that it had only a slight cough. The cow's condition was good, and it was only microscopic evidence that showed traces of tuberculosis. How was Jones to know if a cow had tuberculosis when the veterinary surgeon himself was not sure at first, he asked. He (counsel) submitted that no offence had been committed, as Jones did not know the cow was infected with tuberculosis. When Jones had asked the veterinary surgeon if the cow had tuberculosis he had replied that he could not say.

Defendant said there was nothing to indicate that the cow was suffering from tuberculosis.

It was stated that a *post-mortem* examination had revealed that the cow was infected with tuberculosis although not in an advanced stage.

After a retirement the Chairman said it had been a difficult case, but they had decided that an offence had been committed by Jones not notifying the police or a veterinary surgeon. He would be fined 40s.

Mr. Clement O. Jones hinted that there might be an appeal.

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HIGHER EDUCATION IN THE COLONIES

The Colonial Office announces the names of the members of the Commission which, as Colonel Oliver Stanley stated in the House of Commons on July 13th, is to enquire into higher education in the colonies. The Chairman is Sir Cyril Asquith. The terms of reference of the Commission will be:—

To consider the principles which should guide the promotion of higher education, learning and research and the development of universities in the colonies; and to explore means whereby universities and other appropriate bodies in the United Kingdom may be able to co-operate with institutions of higher education in the colonies in order to give effect to these principles.

The members of the Commission are:—

Sir Donald Cameron, formerly Governor of Nigeria; Mr. A. M. Carr-Saunders, Director, London School of Economics; Professor H. J. Channon, Professor of Biochemistry, Liverpool University; Sir Fred Clarke, Director, Institute of Education, London University; Mr. J. F. Duff, Vice-Chancellor, Durham University; Lord Hailey, Chairman, Colonial Research Committee; Professor A. V. Hill, M.P., Secretary, Royal Society; Sir James Irvine, Vice-Chancellor, St. Andrews; Sir Richard Livingstone, President, Corpus Christi College, Oxford; Dr. R. Marrs, formerly Principal, University College, Colombo; Miss L. H. Penson, Professor of Modern History, London University; Miss Margery Perham, M.A., Director of Colonial Research, Nuffield College, Oxford; Professor J. A. Ryle, Professor of Social Medicine, Oxford; Dr. R. V. Southwell, Rector, Imperial College of Science and Technology; Dr. J. A. Venn, Vice-Chancellor, Cambridge.

At the same time Colonel Stanley announced the setting up of a further commission of enquiry into higher education in British West Africa under the Chairmanship of Colonel Walter Elliott, M.P.

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NEW FIRE GUARD REGULATIONS

A memorandum filling 72 closely printed pages has been published by the Stationery Office (6d. net) to explain the general scope of the Fire Guard Regulations and Orders and the difference between them and the earlier instructions. Under the new Orders the lower age limits for compulsory fire guard duties are unchanged (18 for men and 20 for women); the upper age limit of 45 for women is unchanged, but the upper age limit for men has been fixed at 63. For volunteers the age limits are: men, 16 to 69; women, 18 to 59, all inclusive.

At business premises the general system remains as before; the occupier has to make arrangements in consultation with the workers and notify his plans to the appropriate authority for approval. Probably the most important change is the decision that in future there must be a fixed team of fire guards for each premises. Workers not selected for this team will perform the whole of their duties at home where this is in a prescribed area. Women will only be liable outside their working hours for compulsory fire guard duties at the place where they work if there are not enough men available at the premises.

The Orders come into operation on September 20th, 1943.

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"VICTORY" CHURN CONTEST

Next year's awards of the Royal Agricultural Society's Trophy and of the "Victory" Churns will be decided on the basis of milk production during the period October 1st, 1943 to March 31st, 1944, and on the targets that have been set for each county's milk production in this period. The league leaders and contest winners will be those counties whose winter milk sales show the greatest percentage increase over the target.

Certificates of merit will be awarded to individual farms, as before, but on the following basis: (a) A "Red" certificate to

each farm showing an increase of 10 per cent. or more in comparison with last year's sales of winter milk; (b) A "Blue" certificate to each farm showing average milk sales for the herd of two gallons (or more) per cow per day throughout the winter period.

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COUNTY REGISTER OF LIVESTOCK

In view of Mr. Hudson's recent remarks about the standard of our livestock, it is interesting to note the Dorset W.A.E.C. move in compiling a county register of livestock, states *The Farmer and Stock-Breeder*, and proceeds: "Convinced that a prosperous dairy industry will be of great importance after the war, the Committee feel that it is of the greatest importance that farmers should know where they can obtain pedigree and non-pedigree milk-recorded bulls or bull calves.

"Before a herd is accepted for inclusion in the register it will be inspected by the Ministry of Agriculture's Live Stock Officer, a Ministry of Agriculture Veterinary Surgeon, and by a member of the staff of the Committee. This inspection will be for the purpose of approving cows as being of suitable breed type, conformation and yield.

"For a herd to be accepted it must be headed by a qualified dairy bull. It is proposed that bull calves offered for sale from registered herds under the scheme shall be from cows giving at least 800 gallons for the lactation of 365 days or from a heifer giving 650 gallons for the lactation of 365 days. In each case the herd should be Attested, T.T., or Accredited. The calves will be ear-marked within 28 days of birth. It will be possible, if desired, to enter heifer calves under the scheme, except that in this case the individual record of the dam will be replaced by the herd average on milk yields for the winter months, which must be 1½ gallons or over.

"In one further direction the scheme might be of advantage in connection with the disposal of well-bred dairy bulls of proved fertility which the owner wishes to sell because a change of blood is required in his herd."

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Weekly Wisdom

When Shakespeare has to describe a horse, mark how definite he is:—

Round-hoof'd, short jointed, fetlocks shag and long,
Broad heart, full eye, small head and nostril wide,
High crest, short ears, straight legs and passing strong;
Thin mane, thick tail, broad buttock, tender hide.

—Sir Arthur Quiller-Couch (Cambridge Lectures).

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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VETERINARY EDUCATION

Sir,—I have just received the *Record* of July 31st, 1943, with its supplement containing the "Draft Evidence of the Committee on Veterinary Education" with appendix.

Has it not become fashionable for older members to belittle the quality of modern veterinary education, and hence the abilities of the younger members, and does this not, to a certain extent, explain the apparent readiness of a section of Council, N.V.M.A., to give away what appears to others the keystone of veterinary education?

Until the present, the curriculum and the examinations have been under the direct control of experienced and practical members of the profession who may be expected to know what knowledge is required to equip the graduate. Are we now to abandon this principle, and by abstracting the keystone cause the whole architecture to collapse into disunited components? If the R.C.V.S. controls curriculum and examinations the "one portal" system will be preserved, and no change therefore need be made. If any slackening of control takes place, what control is there to be? Will the R.C.V.S. refuse membership to persons graduating from a university or college on the grounds that the course was not adequate? If this is so, it is inevitable that many will take and pay for part, or all, of courses that are useless. A university degree in addition to membership of the Royal College may be desirable. In that case a dual course can be taken which will tend to widen the knowledge of the graduate with no need whatsoever for the degree to confer licence to practice. In my experience, naturally mainly among younger members of the profession, the only complaint I have ever heard about the present system has been in reference to the fact that the "one portal" system has been partly emasculated by the difficulties of transport in wartime.

We whose education is still fresh in our minds are proud of it, and of the unity the "one portal" system gives to us, and must regret and resist any attempt to lower the standard of the profession—for that is what this proposal to abolish the "one portal" system means in practice whatever the lofty principles that inspire it. Veterinary education is, at present, better than ever before, and is better than that in related professions. Certainly it can be improved, anything good is susceptible of improvement, but it is improvement that is called for, not demolition.

I must welcome the strenuous efforts of certain prominent members of the profession to preserve at least the bare bones of our hard-won heritage. In addition to the large number of younger members who are normally disenfranchised by reason of the fact that they attend the practice while their principal attends Divisional meetings, or who find it policy to agree with the immediate source of their bread (rarely any butter), there are at present a number who are totally unable to make their voices heard, or even keep up to date with veterinary politics by reason of war service. We are the future of the profession and it is regrettable that we should be debarred from any part in matters that concern us vitally, either because we are junior or because we are remote from any centre of discussion. Can we not hear more from those who will be the profession to counter-balance the voices of those who are, at present, influencing a tendency, the culmination of which we, not they, will have as our heritage.

Yours faithfully,

121, St. George's Drive, P. K. Hall-Patch.
London, S.W.1.
August 7th, 1943.

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THE FUTURE OF THE PROFESSION

Sir,—The letter of Mr. T. M. Griffiths in your issue of August 14th is very interesting. It shows that he, at any rate, has profited by the rigorous tests he has received whilst getting his diploma, in that he is able to take a very wide and intelligent view of the activities of the profession. His reflections, however, are open to controversy. I have always held that the first duty of a man in this world is to try and keep a roof over the head of his wife and family and to do this in former times, and more so nowadays, is difficult: it requires *versatility* and a *broad outlook*. I am not so sure that State Departments come near achieving this desirable quality. I should like to ask whether at present and in the past they always carry or have carried out "work that is worthy of the training of the modern veterinarian"—at any rate in its totality. As an addendum to this I should like to enquire how many research institutes of a private and State-aided nature there are and what are the records of each in valuable results achieved—both seem to me to be necessary and controversy could be as voluminous on the question as that of "the little man" versus "the multiple stores."

Hospitalisation of animals is hardly separable from their boarding and one doesn't hear much of State Departments supporting and establishing animal hospitals. As regards "a higher scientific plane" I believe that State Departments need a bit of waking up—they don't read and think enough and often work in too narrow circles. The very fact that Mr. Griffiths comments that he would welcome "the inauguration of State control" seems to indicate that up to the present he has not been satisfied with what State control there is. It is true that faith in his work is one of the best assets of the veterinarian, but this faith should include versatility and a broad outlook or else his work will be truncated by State Departments.

I hope as a result of this letter of Mr. Griffiths that some trenchant views will be expressed on this matter. Some attention wants to be paid to the veterinary labourer being "worthy of his hire" when there is no agricultural depression.

Yours faithfully,

Bolton. G. Mayall.

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ARTIFICIAL INSEMINATION

Sir,—A very experienced stud groom has informed me that he has had personal experience of the insemination of up to 700 thoroughbred mares, but has never known a winner bred by such means.

The experience of advocates of artificial insemination and their comments on the above would be interesting.

Yours faithfully,

"Yondercott," J. Fox.
Taunton.
August 15th, 1943.